

Beer Bottle Night Lamp

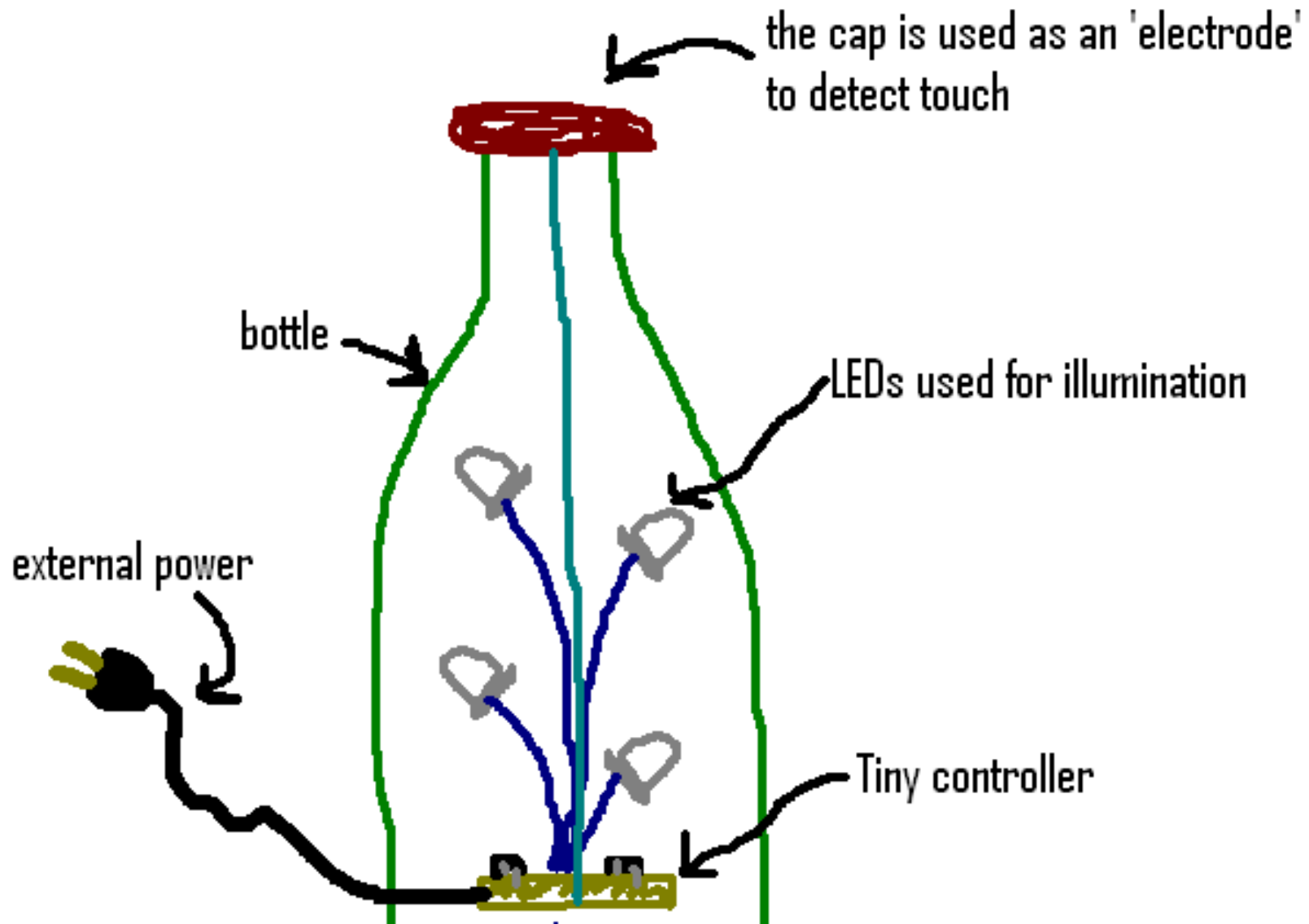
...a bit more than just sticking a bulb inside a bottle!

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A highly technical overview...



I am mainly going to talk about capacitive touch sensing and how to use a flip-flop+transistor as an on/off switch

Capacitive Touch Sensing

- Serious business...
 - ...if you are sensing multiple ‘touches’
 - Single touch detection is easy
 - ‘Hot Topic’
 - Loads of alternative solutions/vendors
- This talk is about a single ‘button’ application

Choices...

Cypress CapSense

Microchip mTouch

Atmel (Quantum) Qtouch / maxTouch

Simple PNP transistor

STMicro S-Touch

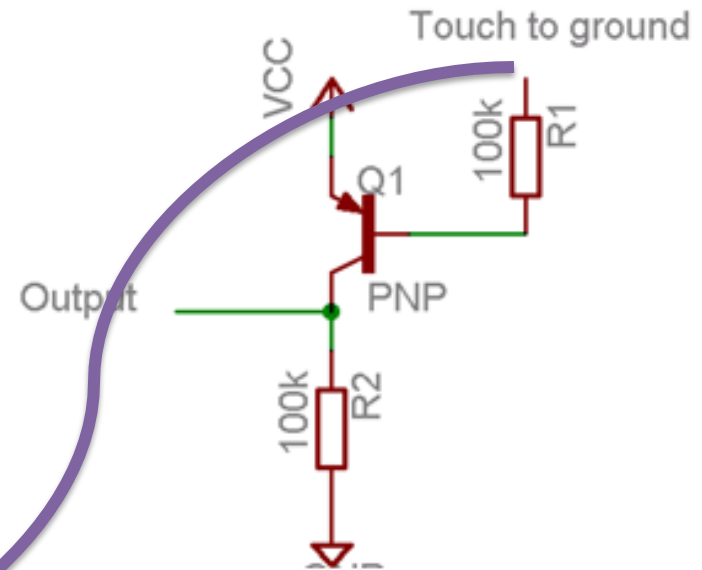
etc...

Simple PNP Transistor

Basic Touch Circuit



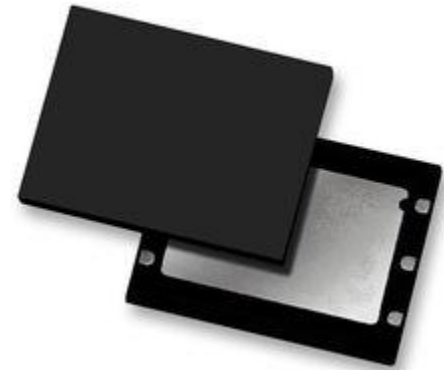
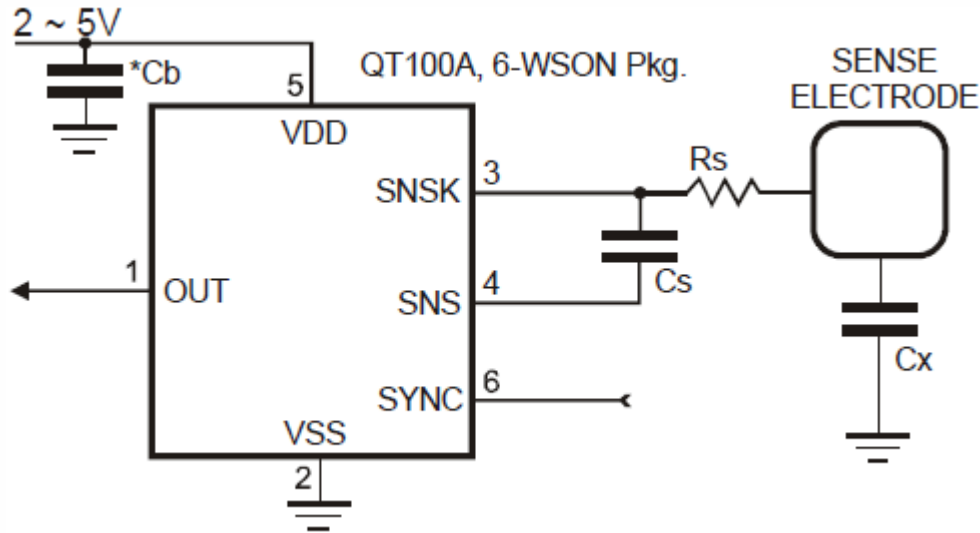
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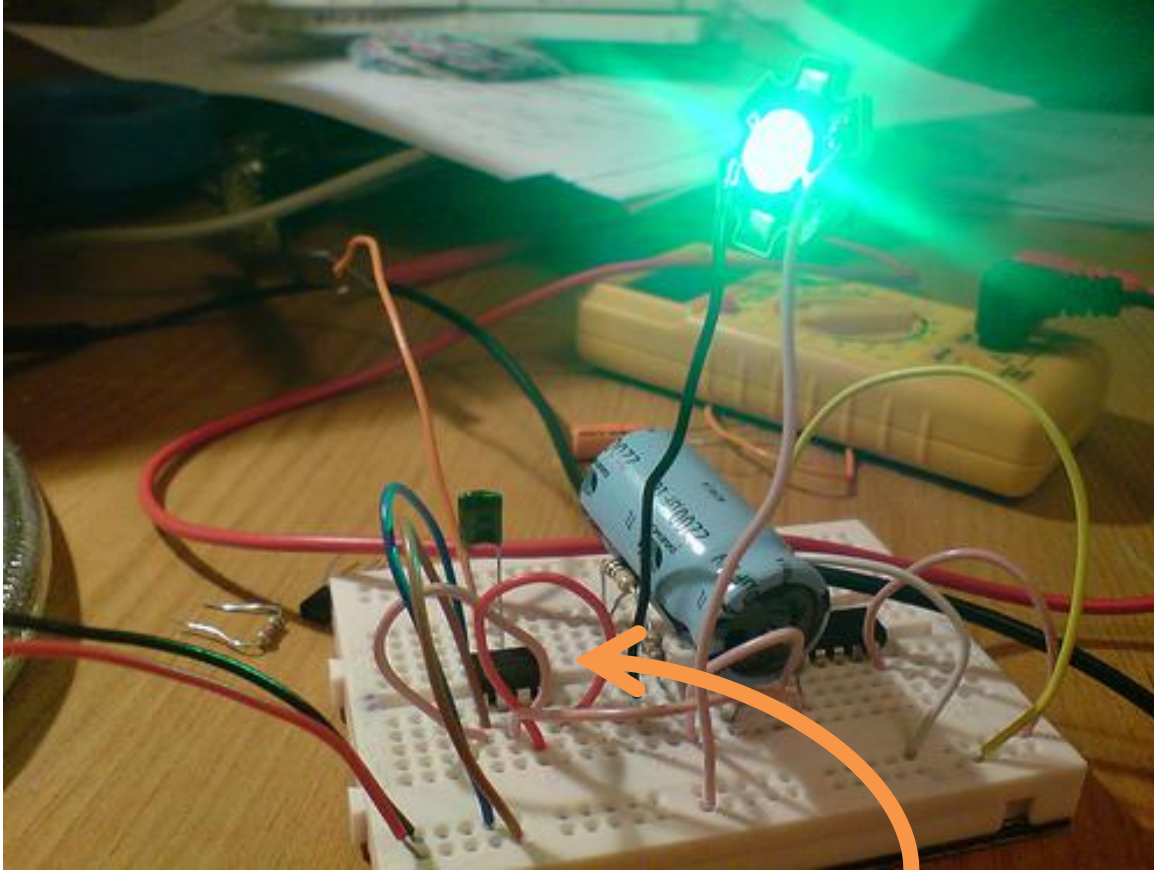
- Cheapest
- Kinda hacky...

QT100A a.k.a AT42QT100A

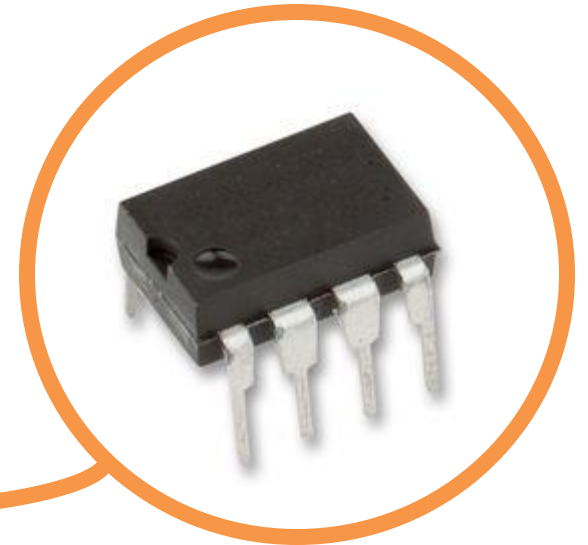


- Horrible package to hand solder
- Easiest implementation
- Cost not too bad...

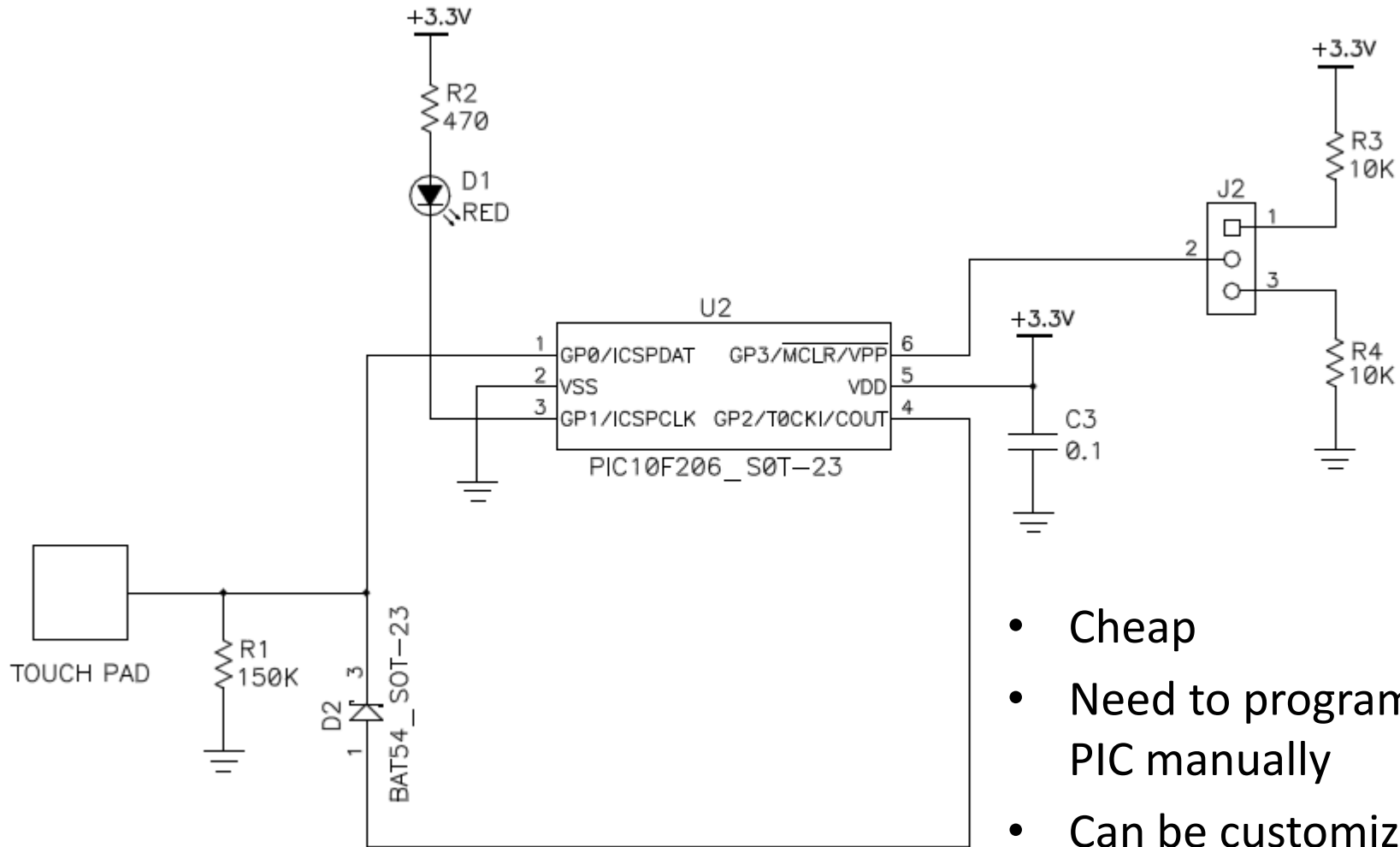
QT110



- Simple package
- Seems to be obsolete 😞



AN1202 - Capacitive Sensing with PIC10F

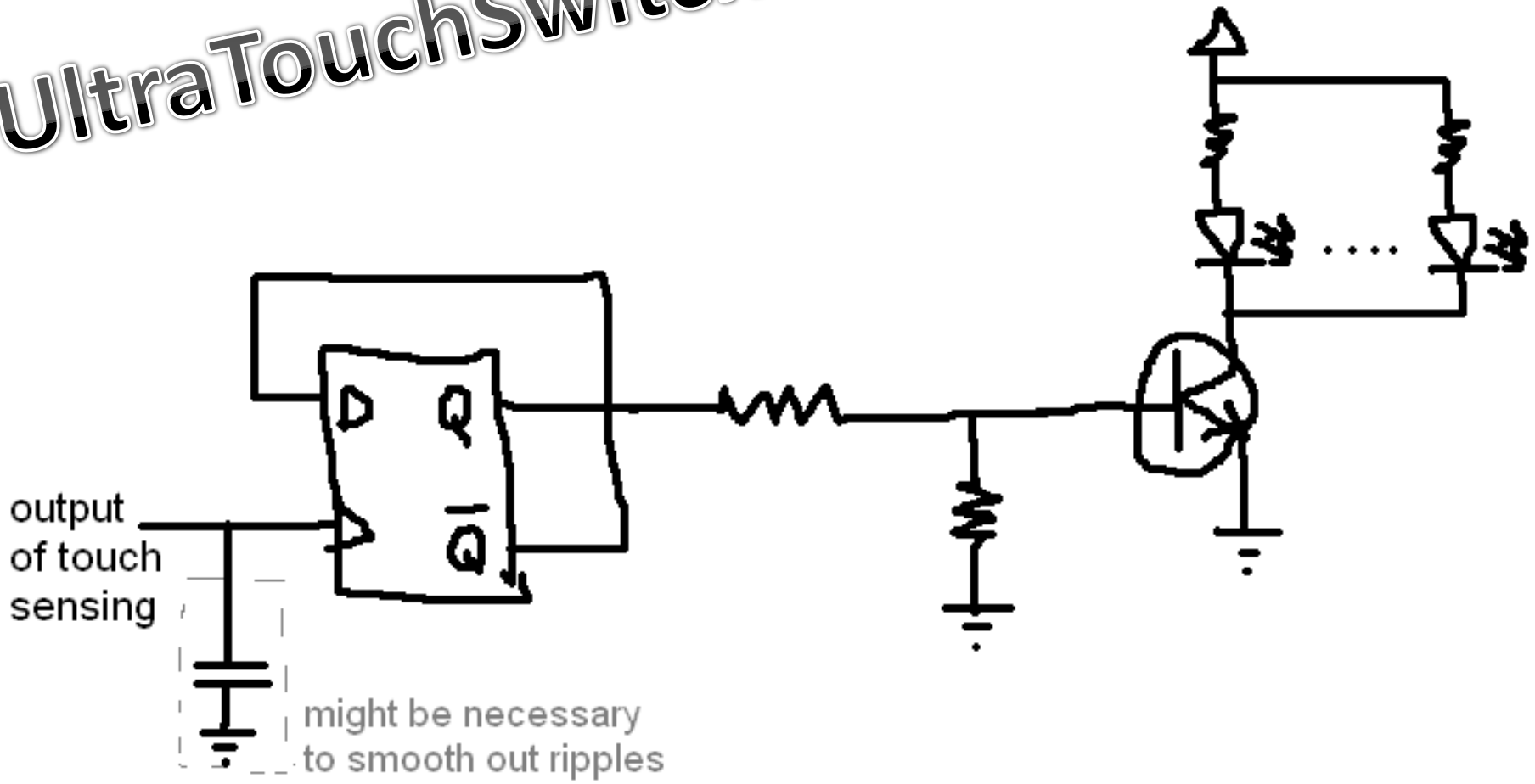


- Cheap
- Need to program the PIC manually
- Can be customized!

Right, we got the 'touch' bit working...

- Next step is to create a simple controller...

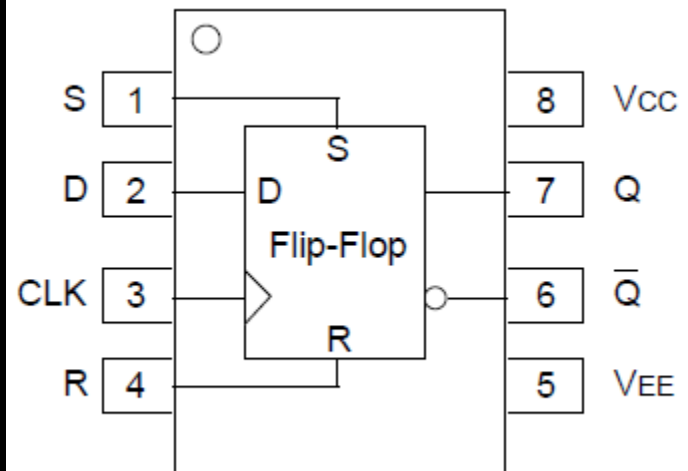
UltraTouchSwitchNG3000 (tm)



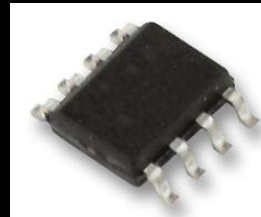
Flip-Flop?

```
entity FlipFlop is
  port (
    CLK : in std_logic;
    D    : in std_logic;
    Q    : out std_logic;
    NQ   : out std_logic
  );
end FlipFlop;

architecture Behav of FlipFlop is
begin
  process(CLK)
  begin
    if (CLK'event) and (CLK='1') then
      Q <= D;
      NQ <= not D;
    end if;
  end process;
end Behav;
```



Clock	D	Q	Q _{prev}
Rising edge	0	0	X
Rising edge	1	1	X
Non-Rising	X	Q _{prev}	



That's all folks...

Thanks for listening, any questions?

Comments/Suggestions to omer@tinkersoc.org please...